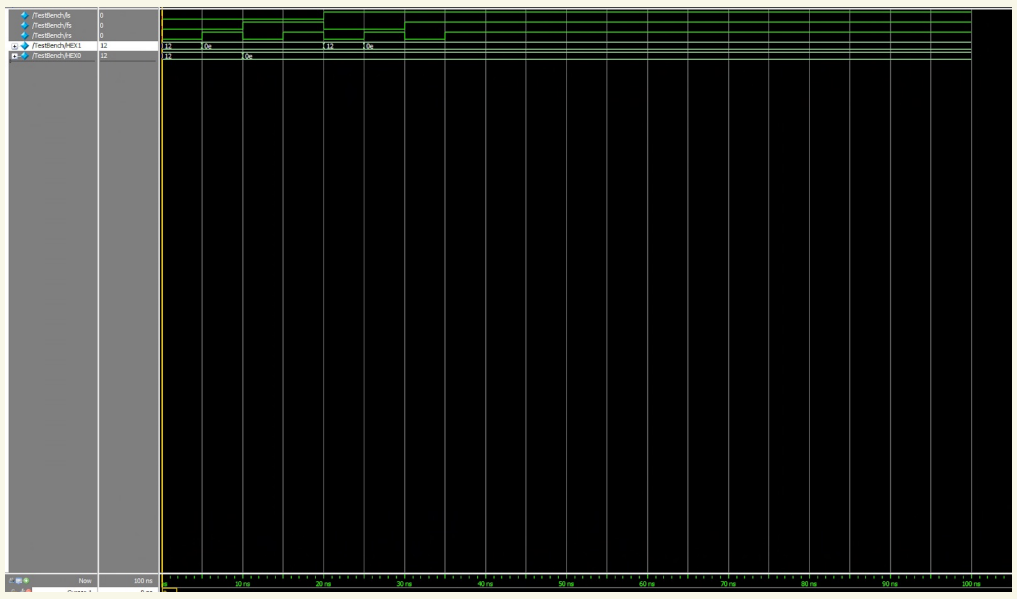
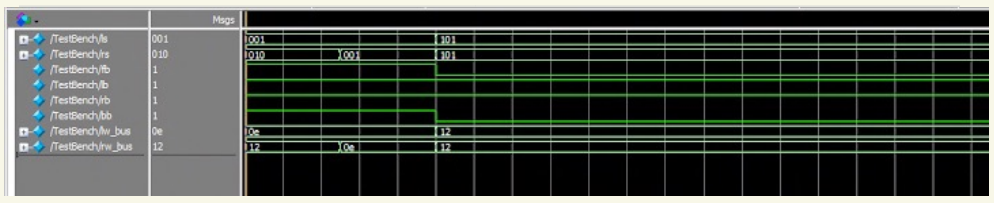
Question 1



Question 2



Question 3

Consider what would happen if Renee detected the beacon in front of herself (so left and right are equal) and was thus moving forward, and then she hit some barrier between herself and the beacon (activating her front bumper). Answer the following questions: (15 points)

A. What would an observer see her do (over time)?
B. Would she ever reach the beacon? Why or why not?
C. Renee, as described, maintains no state. That is, she only reacts to the current situation without any memory of the past. How could having state help in this case?

● beacon

barrier

☐ Renee

A:

- The Renee will first go forward, then only the front bumper sensor detect a collision. So she will move in reverse.
- Because after Renee moves in reverse, both left sensor and right sensor detect the same strength of beacon and both of them are non-zero. At the same time, All of four bumpers don't detect any collision. So Renee should go forward.
- So the conclusion is the Renee will go forward, then go reverse and repeat these motions all the time

B

Renee will never reach the beacon, the reason is she will only repeats the movement of going forward and going reverse.

C

if Renee has state, then after the first time her front bumper detects the collision, she will know there is a barrier between herself and the beacon. She will have some more advanced strategies. For example maybe after she go reverse, then she will turn right, then go, then turn left, then go forward.